

Package ‘RAGFlowChainR’

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Type Package

Title Retrieval-Augmented Generation (RAG) Workflows in R with Local and Web Search

Version 0.1.3

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Description Enables Retrieval-Augmented Generation (RAG) workflows in R by combining local vector search using 'DuckDB' with optional web search via the 'Tavily' API. Supports 'OpenAI'- and 'Ollama'-compatible embedding models, full-text and 'HNSW' (Hierarchical Navigable Small World) indexing, and modular large language model (LLM) invocation. Designed for advanced question-answering, chat-based applications, and production-ready AI pipelines. This package is the R equivalent of the 'python' package 'RAGFlowChain' available at <<https://pypi.org/project/RAGFlowChain/>>.

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Encoding UTF-8

RoxygenNote 7.3.2

URL <https://github.com/knowusuboaky/RAGFlowChainR>,
<https://knowusuboaky.github.io/RAGFlowChainR/>

BugReports <https://github.com/knowusuboaky/RAGFlowChainR/issues>

Depends R (>= 4.1.0)

Imports DBI, duckdb (>= 0.10.0), httr, dplyr, pdftools, officer,
rvest, xml2, curl,

Suggests testthat (>= 3.0.0), jsonlite, stringi, magrittr, roxygen2

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create_rag_chain	<i>create_rag_chain.R Overview</i>
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Description

A refined implementation of a LangChain-style Retrieval-Augmented Generation (RAG) pipeline. Includes vector search using DuckDB, optional web search using the Tavily API, and a built-in chat message history.

This function powers 'create_rag_chain()', the exported entry point for constructing a full RAG pipeline.

Features: - Context-aware reformulation of user queries - Semantic chunk retrieval using DuckDB - Optional real-time web search (Tavily) - Compatible with any LLM function (OpenAI, Claude, etc.)

Required Packages `install.packages(c("DBI", "duckdb", "httr", "jsonlite", "stringi", "dplyr"))`

Arguments

- `llm` A function that takes a prompt and returns a response (e.g. a call to OpenAI or Claude).
- `vector_database_directory` Path to the DuckDB database file.
- `method` Retrieval method backend. Currently only "DuckDB" is supported.
- `embedding_function` A function to embed text. Defaults to `embed_openai()`.
- `system_prompt` Optional prompt with placeholders `{chat_history}`, `{input}`, `{context}`.
- `chat_history_prompt` Prompt used to rephrase follow-up questions using prior conversation history.
- `tavily_search` Tavily API key (set to NULL to disable web search).
- `embedding_dim` Integer; embedding vector dimension. Defaults to 1536.
- `use_web_search` Logical; whether to include web results from Tavily. Defaults to TRUE.

Details

Create a Retrieval-Augmented Generation (RAG) Chain

Creates a LangChain-style RAG chain using DuckDB for vector store operations, optional Tavily API for web search, and in-memory message history for conversational context.

Value

A list of utility functions:

- `invoke(text)` — Performs full context retrieval and LLM response
- `custom_invoke(text)` — Retrieves context only (no LLM call)
- `get_session_history()` — Returns complete conversation history
- `clear_history()` — Clears in-memory chat history
- `disconnect()` — Closes the underlying DuckDB connection

Note

Only `create_rag_chain()` is exported. Helper functions are internal.

Examples

```
## Not run:
rag_chain <- create_rag_chain(
  llm = call_llm,
  vector_database_directory = "tests/testthat/test-data/my_vectors.duckdb",
  method = "DuckDB",
  embedding_function = embed_openai(),
  use_web_search = FALSE
)

response <- rag_chain$invoke("Tell me about R")

## End(Not run)
```

create_vectorstore	Create a DuckDB-based vector store
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Description

Initializes a DuckDB database connection for storing embedded documents, with optional support for the experimental ‘vss’ extension.

Arguments

db_path	Path to the DuckDB file. Use “:memory:” to create an in-memory database.
overwrite	Logical; if ‘TRUE’, deletes any existing DuckDB file or table.
embedding_dim	Integer; the dimensionality of the vector embeddings to store.
load_vss	Logical; whether to load the experimental ‘vss’ extension. This defaults to ‘TRUE’, but is forced to ‘FALSE’ during CRAN checks.

Details

This function is part of the vector-store utilities for:

- Embedding text via the OpenAI API
- Storing and chunking documents in DuckDB
- Building ‘HNSW’ and ‘FTS’ indexes
- Running nearest-neighbour search over vector embeddings

Only `create_vectorstore()` is exported; helpers like `insert_vectors()`, `build_vector_index()`, and `search_vectors()` are internal but designed to be composable.

Value

A live DuckDB connection object. Be sure to manually disconnect with: `DBI::dbDisconnect(con, shutdown = TRUE)`

Examples

```
## Not run:
# Create vector store
con <- create_vectorstore("tests/testthat/test-data/my_vectors.duckdb", overwrite = TRUE)

# Assume response is output from fetch_data()
docs <- data.frame(head(response))

# Insert documents with embeddings
insert_vectors(
  con = con,
  df = docs,
  embed_fun = embed_openai(),
  chunk_chars = 12000
)

# Build vector + FTS indexes
build_vector_index(con, type = c("vss", "fts"))

# Perform vector search
response <- search_vectors(con, query_text = "Tell me about R?", top_k = 5)

## End(Not run)
```

Description

Extracts content and metadata from local documents or websites. Supports:

- Local files: PDF, DOCX, PPTX, TXT, HTML
- Crawled websites: with optional breadth-first crawl depth

Arguments

local_paths	A character vector of file paths or directories to scan for documents.
website_urls	A character vector of website URLs to crawl and extract text from.
crawl_depth	Integer indicating BFS crawl depth; use NULL for unlimited depth.

Details

The returned data frame includes structured columns such as: source, title, author, publishedDate, description, content, url, and source_type.

```
## Required Packages install.packages(c("pdftools", "officer", "rvest", "xml2", "dplyr",  
"stringi", "curl", "httr", "jsonlite", "magrittr"))
```

Value

A data frame with extracted metadata and content.

Note

Internal functions used include read_local_file(), read_website_page(), and crawl_links_bfs().

Examples

```
## Not run:  
local_files <- c("tests/testthat/test-data/sprint.pdf",  
                "tests/testthat/test-data/introduction.pptx",  
                "tests/testthat/test-data/overview.txt")  
website_urls <- c("https://www.r-project.org")  
crawl_depth <- 1  
  
response <- fetch_data(  
  local_paths = local_files,  
  website_urls = website_urls,  
  crawl_depth = crawl_depth  
)  
  
## End(Not run)
```

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